REMARKS/ARGUMENTS

Claims 12 and 19 were rejected under 35 U.S.C. §112, first paragraph.

The Office Action contains an assertion that the limitation "wherein said primary particles consist essentially of particles having at least one side of each flat crystal face of length of 1 μm or more" is not in the original disclosure.

Claims 12 and 19 recite that the primary particles *consist essentially of* particles having at least one side of each flat crystal face of length of 1 μm or more, meaning that the primary particles of the positive electrode active material can include non-conforming particles (i.e., particles which do not have at least one side of each flat crystal face of length of 1 μm or more), so long as there are not so many of such non-conforming particles that the basic and novel characteristics of the present invention are materially affected. That is, as has been repeatedly and consistently held, the expression "consisting essentially of" renders the claim open only for the inclusion of unspecified ingredients which do not materially affect the basic and novel characteristics of the claimed invention (e.g., *ex parte Davis and Tuukkanen*, 80 USPQ 448,450 (Pat. Ofc. Bd. App. 1948). Those basic and novel characteristics of the invention include significant reduction in internal resistance and good repeated cycle properties, as described throughout the present specification.

The original specification, page 5, lines 12-15, discloses that the primary particles preferably contain primary particles in which at least one side of each flat crystal face has a length of 0.2 μm or more, preferably 1 μm or more. The original specification, page 8, lines 21-23, discloses that "[t]he positive electrode active material used in the present lithium secondary battery is characterized by consisting of primary particles mostly having the above-mentioned [i.e., substantially octahedral shape] morphology." The original specification, page 8, lines 23-24, discloses that all the primary particles need not have a substantially

octahedral shape. These portions of the specification demonstrate that the present inventors had possession of the claimed subject matter. The statement referred to in the Office Action that all the primary particles *need not* have a substantially octahedral shape (original specification, page 8, lines 23-24) (1) confirms that the specification contemplates subject matter in which all primary particles have a substantially octahedral shape, and (2) indicates that the invention nonetheless covers subject matter in which less than all of the primary particles have a substantially octahedral shape.

The original specification, page 8, lines 7-20, notes that the expression "substantially octahedral shape" includes not just primary particles having octahedral shape, but also primary particles of other shapes, namely, (a) particles wherein the apex formed by intersection of four crystal faces is not complete and is in the form of a plane or an edge, (b) particles in which a different crystal face is formed at an edge formed by intersection of two crystal faces, and (c) particles in which one crystal face is jointly owned by two primary particles or in which a primary particle grows from the surface of another primary particle, as well as shapes formed by partial chipping of the above shapes or joint possession of crystal faces between two primary particles. Claim 12 and 19, by virtue of their dependencies on claims 10 and 17, respectively, recite that the primary particles have a *substantially* octahedral shape.

The Office Action further contains a statement that the specification "states that the particle diameters of the primary particles are obtained by analysis of the SEM image and the particle diameter measurement for individual particles are impossible." This statement leaves out a critical portion of the statement in the specification to which it refers. In particular, the statement in the specification reads "[t]he particle diameters of the primary particles are expressed as particle diameters obtained by the analysis of SEM image because the separation

of individual particles and the particle diameter measurement for individual particles are impossible." The complete statement in the specification clearly describes that particle diameters of the primary particles are expressed as particle diameters obtained by the analysis of SEM image, and that the reason particle diameters of the primary particles are expressed in this way is because the separation of individual particles is impossible. This statement in no way indicates that expression of particle diameters of the primary particles is impossible.

The Office Action further contains statements to the effect that the specification indicates that the amount of particles having particle diameters outside the specified ranges are at a level not ordinarily detected in the measurement methods described in the specification. As noted above, the recitation "consisting essentially of" does not require that *every* primary particle satisfy the recited feature, but rather that the amount (if any) of primary particles not satisfying the recited feature is not so large as to materially affect the basic and novel characteristics of the present invention.

In view of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 11-24 were rejected under 35 U.S.C. §112, first paragraph.

The Office Action acknowledges that the specification is enabling for forming a positive electrode comprising $Li(Ni_{0.5}Ti_{0.5})_{0.15}Mn_{1.85}O_4$. The Office Action contains a statement that the specification ". . . does not reasonably provide enablement for forming all positive electrode material comprising mainly Li and Mn . . ." (Office Action, page 4, lines 2-4 from last). The Office Action further contains a statement that "[t]he specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims." (Office Action, page 5, lines 2-3). The Office Action further contains a statement that "[t]he claimed

invention encompasses compounds that are outside the scope of the one working example and disclosure." (Office Action, page 5, lines 4-5). Further, the Office Action contains a statement that "[h]ence undue experimentation would be required to determine what other compounds other than those disclosed by Applicant can be used to make and practice applicant's invention as claimed." (Office Action, page 5, lines 7-9).

The enablement requirement of 35 U.S.C. 112 does not require that an applicant discover which members within a generic group function properly in accordance with the invention. For example, see *In re Fuetterer*, 138 USPQ 217, 223 (CCPA 1963), in which the USPTO objected to the breadth of certain claims, stating that there would be an undue burden placed upon the public to determine what salts are suitable for obtaining the desired results, and then the CCPA held that there is no requirement that an applicant discover which of all the salts within the generic expression in the claim would function properly in the invention.

Moreover, the U.S. PTO, in rejecting claim under enablement requirement of 35 U.S.C. 112, bears the initial burden of setting forth a reasonable explanation of why the scope of protection provided by a claim is not adequately enabled by the specification's description of invention, and this burden includes providing sufficient reasons for doubting any assertions in specification as to the scope of enablement; if the U.S. PTO meets this burden, then the burden shifts to applicant to provide suitable proofs indicating that specification is enabling. *In re Wright* 27 USPQ2d 1510, 1514 (Fed. Cir. 1993). With regard to proof of utility and operability of inventions, an invention is presumed to be operable as disclosed. The burden shifts only if there is a reasonable doubt as to the truth of the applicants' assertions. Accordingly, a rejection for lack of enablement can only be made if there is reason to doubt the objective truth of the statements that the invention would be useful as disclosed in the specification. Thus, whenever a rejection on this basis is made, it is

incumbent upon the uspto to explain *why* it doubts the truth or accuracy of a statement in a supporting disclosure, and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. *In re Marzocchi & Horton*, 169 USPQ 367, 369 (CCPA 1971).

The U.S. PTO, however, has not provided any explanation as to why it doubts the truth or accuracy of the statements in the present application that the present invention is operable as disclosed, e.g., in the original specification, page 12, lines 3-12.

A specification which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in the claims must be accepted as satisfying the enablement requirement unless there is reason to doubt the objective truth of the statements in the specification. It is incumbent upon the USPTO, whenever a rejection is made on the basis of such doubt, to explain why it doubts the truth or accuracy of any statement in the disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. *In re Armbruster*, 185 USPQ 152, 153 (CCPA 1975).

In view of the above, it is respectfully requested that the U.S. PTO consider and withdraw this rejection.

Claims 11-16 and 24 were rejected under 35 U.S.C. §112, second paragraph.

The Office Action includes a statement that the meaning of the term "mainly" previously recited in claim 13, is unclear. Claim 13 has been amended as set forth above, and no longer includes the term "mainly". It is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 11-14, 17-21 and 24 were rejected under 35 U.S.C. §102(b), or under 35 U.S.C. §103(a), over Japanese 08-217452 (JP '452).

The present invention is directed to a method of reducing internal resistance of a lithium secondary battery. The method comprises forming an electrode body which includes a positive electrode comprising positive electrode active material, the primary particles of which have a substantially octahedral shape constituted mainly by flat crystal faces, such primary particles including particles having at least one side of each flat crystal face of length of 1 μm or more.

JP '452 does not disclose or suggest welding a plurality of current collecting portions directly to the positive electrode or welding a plurality of current collecting portions directly to the negative electrode. In addition, JP '452 does not address (or otherwise disclose or suggest) reducing internal resistance. The welding of a plurality of current collecting portions directly to the positive electrode and the welding of a plurality of current collecting portions directly to the negative electrode recited in the present claims contribute to the reduction of internal resistance according to the present invention. Accordingly, for these reasons, JP '452 does not anticipate or render obvious any of the claimed subject matter.

In addition, JP '452 is directed to a *needle-like* particle shape manganese complex oxide. The statements in the Office Action overlook the express statements in JP '452 that the particles of JP '452 are *needle-like*. The U.S. PTO attempts to argue that a *needle-like* regular octahedron would have the same shape as a regular octahedron, i.e., that the expression "needle-like" does not carry with it any meaning at all. To the contrary, a regular octahedron needle-like particle consists of a pair of regular octahedral-shaped end regions having an extension portion therebetween, rendering the particle "needle-like." It is further noted that the expression "regular-octahedron needle-like" is far more descriptive of the shape to which it refers than is the expression "dodecahedral" (i.e., any shape having twelve surfaces). That the expression in JP '452 of "needle-like regular octahedron" indicates that

the structure is not regular octahedron in shape, is analogous to the fact that a "truncated cone" is not of a cone shape.

Similarly, the needle-like regular octahedron shapes disclosed in JP '452 do not fall within any of the definitions of "substantially octahedral shape" contained in the present specification, i.e., (a) particles wherein the apex formed by intersection of four crystal faces is not complete and is in the form of a plane or an edge, (b) particles in which a different crystal face is formed at an edge formed by intersection of two crystal faces, and (c) particles in which one crystal face is jointly owned by two primary particles or in which a primary particle grows from the surface of another primary particle, as well as shapes formed by partial chipping of the above shapes or joint possession of crystal faces between two primary particles.

In addition, attached hereto is a good quality image of Figs. 3 and 4 of JP '452 which shows that the particles therein are not regular octahedral (see in particular the particle marked with an asterisk on a second attached copy of Figs. 3 and 4 of JP '452).

The Office Action further contains a statement that ". . . since the positive electrode active material has the same particle shape, composition, and primary particle size as those disclose in the specification and being claimed in the instant claims, the primary particles inherently include particles having at least one side of each flat crystal face of length of 1 micron or more."

It is respectfully noted that in order for principles of inherency to apply, the missing descriptive material must *necessarily* be present, not merely probably or possibly present, in the prior art. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999), citing *Continental Can Co. USQ, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

The present specification discloses that production of the positive electrode active material of the present invention is conducted by firing a raw material mixture consisting of given proportions of salts and/or oxides of various elements in an oxidizing atmosphere at 700 to 900°C for five to fifty hours (original specification, page 11, lines 5-10). The specification further discloses that when the firing temperature is low, growth of particles hardly takes place, making it difficult to obtain a positive electrode active material constituted by primary particles having intended particle diameters and an intended shape, whereas when the firing temperature is high, large primary particles are formed but neck growth occurs between primary particles and each neck portion becomes rounded (original specification, page 11, lines 11-17). Thus, the specification discloses, by selecting the composition of raw materials and the firing conditions appropriately, it is possible to control the average particle diameter of the primary particles obtained and the morphology of the primary particles (original specification, page 12, lines 3-6). For example, the specification discloses, in the positive electrode active material of comparative example 2, in which a positive electrode active material was obtained by weighing and mixing powders of Li_2CO_3, MnO_2 and B_2O_3 and then firing the resulting mixture in an oxidizing mixture at 800°C for twenty-four hours, striking particle growth was observed and the primary particles were roundish, and that primary particles having a substantially octahedral shape could be obtained by lowering the synthesis temperature and/or shortening the synthesis time in order to suppress the particle growth (original specification, page 12, lines 6-12 and page 14, lines 10-14).

Even within the broad description of the process set forth in the present specification, page 11, lines 5-10, obtaining the properties recited in the present claims is clearly not inherent. With the guidance provided in the present specification (e.g., page 12, lines 9-12), persons of skill in the art are provided with the information needed in order to be readily able

to produce positive active material which does satisfy the parameters recited in the claims by appropriate selection of raw materials and firing conditions within the scope of the process described in page 11, lines 5-10, without having to engage in an undue amount of experimentation.

Without the guidance provided by the present specification or the subject matter recited in the present claims, persons of skill in the art would have no reason to attempt to make selections from within the broad disclosure in JP '452 so as to arrive at a battery having a positive electrode comprising positive electrode active material which satisfies the features recited in the present claims. In fact, JP '452 instead motivates persons of skill in the art to attempt to select process conditions and raw materials so as to obtain *regular octahedron needle-like* particles which are then used as a positive electrode active substance.

As noted above, the present invention is directed to a method of *reducing internal resistance* of a lithium secondary battery, and JP '452 does not address (or otherwise disclose or suggest) reducing internal resistance. The particle shape recited in the present claims contributes to the reduction of internal resistance according to the present invention.

In view of the of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 11-14 and 17-21 were rejected under 35 U.S.C.§102(b) or under 35 U.S.C.§103(a) over U.S. Patent No. 5,631,104 (Zhong '104).

As discussed above, and as demonstrated in the Example and Comparative Examples in the present specification, processing positive electrode active material in the manner described in the present specification, page 11, lines 5-10, does not *inherently* result in production of positive electrode active material having the characteristics recited in the present claims. The specification includes description of an Example in accordance with the

present invention, in which a positive electrode active material was produced which consisted of primary particles having a substantially octahedral shape. The procedures described in Zhong '104 clearly differ from the method used in the Example. There is clearly no basis for the statements in the Office Action to the effect that Zhong '104 discloses identical synthesis conditions and formulas as those of the present applicant, or that the properties recited in the present claims would be inherent (such inherency is clearly disproved by the Comparative Examples reported in the present specification).

Moreover , the process conditions employed in Comparative Examples 1 and 2 were identical to those employed in the Example (differing starting materials were employed) and the Comparative Examples *did not* achieve primary particles having substantially octahedral shape, whereas the Example *did* achieve such primary particles. Accordingly, the Comparative Examples reported in the present specification are closer to the present invention than are the various disclosures in Zhong '104, thereby further disproving the notion of inherency advanced in the Office Action.

In addition, the U.S. PTO points to no disclosure in Zhong '104 which would motivate one of skill in the art to make selections from within the generic disclosure in Zhong '104 so as to attempt to produce positive electrode active material having the morphology as recited in the present claims.

In view of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 11-14 and 17-21 were rejected under 35 U.S.C.§102(e) or 35 U.S.C.§103(a) over U.S. Patent No. 5,961,949 (Manev '949).

Again, as discussed above, and as demonstrated in the Example and Comparative Examples in the present specification, processing positive electrode active material in the

manner described in the present specification, page 11, lines 5-10, does not *inherently* result in production of positive electrode active material having the characteristics recited in the present claims. As noted above, the specification includes description of an Example in accordance with the present invention, in which a positive electrode active material was produced which consisted of primary particles having a substantially octahedral shape. The procedures described in Manev '949 clearly differ from the method used in the Example. There is clearly no basis for the statements in the Office Action to the effect that Manev '949 discloses identical synthesis condition and formulas as those of the present applicant, or that the properties recited in the present claims would be inherent (such inherency is clearly disproved by the Comparative Examples reported in the present specification).

Moreover, as noted above, the Comparative Examples reported in the present specification (in which primary particles having substantially octahedral shape *were not* obtained) are closer to the present invention than are the various disclosures in Manev '949, thereby further disproving the notion of inherency advanced in the Office Action.

In addition, the U.S. PTO points to no disclosure in Manev '949 which would motivate one of skill in the art to make selections from within the generic disclosure in Manev '949 so as to attempt to produce positive electrode active material having the morphology as recited in the present claims.

In view of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 15, 16, 22 and 23 were rejected under 35 U.S.C.§103(a) over each of JP '452, Zhong '104 and Manev '949, each in view of U.S. Patent No. 5,700,597 (Zhong '597).

In each rejection, Zhong '597 is relied on in the Office Action for alleged disclosure of a Li battery as a high energy density source for an electric vehicle. Accordingly, any such

disclosure in Zhong '597 would not overcome the shortcomings of the respective primary references as attempted to be applied against claims 10 and 17, from which each of claims 15, 16, 22 and 23 ultimately depend.

It is therefore respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw these rejections.

Claim 24 was rejected under 35 U.S.C. §103(a) over each of Zhong '104 and Manev '949, each in view of U.S. Patent No. 5,686,203 (Idota '203).

In each rejection, Idota '203 is relied on in the Office Action for alleged disclosure of a positive electrode comprising lithium manganese oxide as the active material, and for disclosing that the positive electrode can comprise a conductivity imparting agent, that the conductivity imparting agent may be carbon black or acetylene black, and that the use of acetylene black is preferred because the resulting battery has high charge and discharge capacities. Accordingly, any such disclosure in Idota '203 would not overcome the shortcomings of the respective primary references as attempted to be applied against claim 13, from which claim 24 depends.

Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

In view of the above, claims 11-14, 16-21, 23 and 24 are in condition for allowance.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

January 4, 2005
Date

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KCB:jms
Attachment:
Image of Figs. 3 and 4 of JP '452

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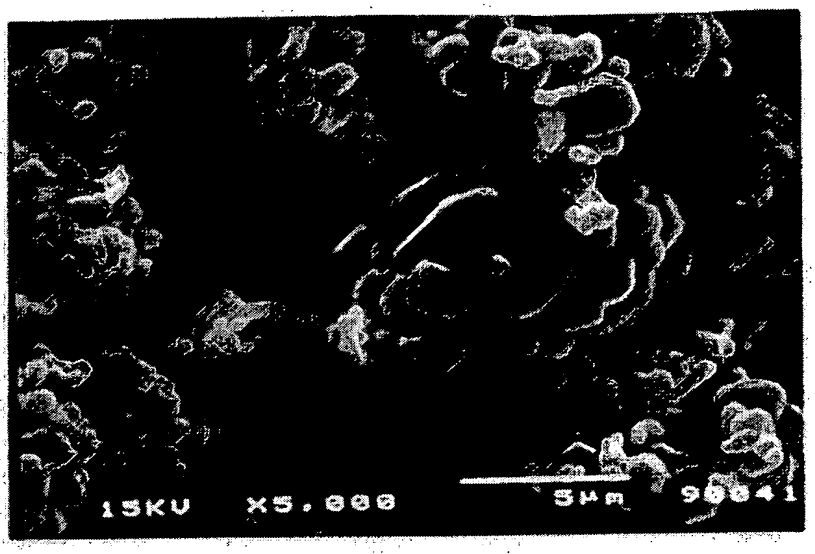

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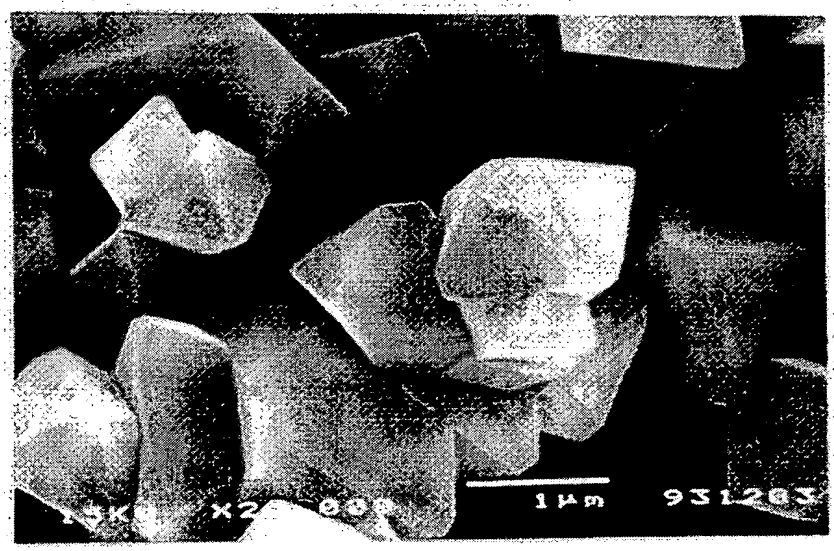

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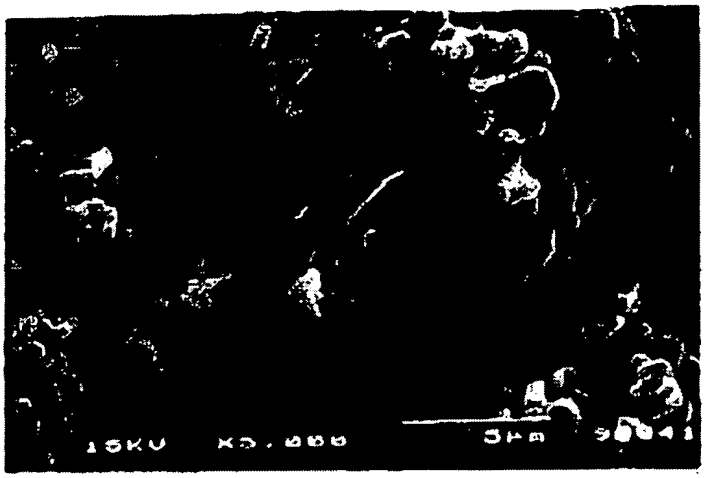

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